

# Low Carbon Fuel Standard Workshop:

## *Introduction and Meeting Overview*

**March 27, 2009**

California Environmental Protection Agency



**Air Resources Board**



# Workshop Comments

- Verbal and written comments submitted at the workshop will not be included in the formal rulemaking record as 45-day public review comments
- Comments will be included in the record if submitted in writing in accordance with the hearing notice or made at the April 23, 2009 Board hearing



# Submitting Comments

- Comments must be received no later than 12:00 noon PST, April 22, 2009
- Mail to: Clerk of the Board  
Air Resources Board  
1001 I Street  
Sacramento, California 95814
- Electronic submittal:  
<http://www.arb.ca.gov/lispub/comm/bclist.php>
- Facsimile submittal: (916) 322-3928



# Today's Meeting Agenda

1. Introduction and Meeting Overview
2. General Discussion of Proposed Regulation
3. Economic Impacts Analysis

*12:00 – 1:00 Lunch*

4. Fuel Pathways and Land Use Change
5. Environmental Impacts Analysis
6. Next Steps



# Staff Contact Information

## ***Policy/Regulation:***

### **Manisha Singh**

Lead, Policy and Regulatory WG

Phone: (916) 323-0014

Email: [mansingh@arb.ca.gov](mailto:mansingh@arb.ca.gov)

### **Floyd Vergara**

Manager, Industrial Section

Phone: (916) 327-5986

Email: [fvergara@arb.ca.gov](mailto:fvergara@arb.ca.gov)

## ***Life Cycle Analysis:***

### **John Courtis**

Manager, Alternative Fuels Section

Phone: (916) 323-2661

Email: [jcourtis@arb.ca.gov](mailto:jcourtis@arb.ca.gov)



# Staff Contact Information

## ***Environmental Analysis:***

**Renee Littaua**

Manager, Fuels Section

Phone: (916) 322-6019

Email: [rlittaua@arb.ca.gov](mailto:rlittaua@arb.ca.gov)

## ***Economic Analysis:***

**Mike Waugh**

Manager, Program Assistance Section

Phone: (916) 445-6018

E-mail: [mwaugh@arb.ca.gov](mailto:mwaugh@arb.ca.gov)

# Low Carbon Fuel Standard Workshop:

## *General Discussion of Proposed Regulation*

**March 27, 2009**

California Environmental Protection Agency



**Air Resources Board**



# Workshop Comments

- Verbal and written comments submitted at the workshop will not be included in the formal rulemaking record as 45-day public review comments
- Comments will be included in the record if submitted in writing in accordance with the hearing notice or made at the April 23, 2009 Board hearing





# Submitting Comments

- Comments must be received no later than 12:00 noon PST, April 22, 2009
- Mail to: Clerk of the Board  
Air Resources Board  
1001 I Street  
Sacramento, California 95814
- Electronic submittal:  
<http://www.arb.ca.gov/lispub/comm/bclist.php>
- Facsimile submittal: (916) 322-3928



# Staff Contact Information

## **Manisha Singh**

Lead, Policy and Regulatory WG

Phone: (916) 323-0014

Email: [mansingh@arb.ca.gov](mailto:mansingh@arb.ca.gov)

## **John Courtis**

Manager, Alternative Fuels Section

Phone: (916) 323-2661

Email: [jcourtis@arb.ca.gov](mailto:jcourtis@arb.ca.gov)

## **Renee Littaua**

Manager, Fuels Section

Phone: (916) 322-6019

Email: [rlittaua@arb.ca.gov](mailto:rlittaua@arb.ca.gov)

## **Floyd Vergara**

Manager, Industrial Section

Phone: (916) 327-5986

Email: [fvergara@arb.ca.gov](mailto:fvergara@arb.ca.gov)



# General Discussion

- Questions?
- Comments
- Presentation by Others



# **Low Carbon Fuel Standard Workshop: Economic Analysis Summary**

**March 27, 2009**

**California Environmental Protection Agency**



**Air Resources Board**



# Workshop Comments

- Verbal and written comments submitted at the workshop will not be included in the formal rulemaking record as 45-day public review comments
- Comments will be included in the record if submitted in writing in accordance with the hearing notice or made at the April 23, 2009 Board hearing



# Submitting Comments

- Comments must be received no later than 12:00 noon PST, April 22, 2009
- Mail to: Clerk of the Board  
Air Resources Board  
1001 I Street  
Sacramento, California 95814
- Electronic submittal:  
<http://www.arb.ca.gov/lispub/comm/bclist.php>
- Facsimile submittal: (916) 322-3928



# Economic Analysis

- **December 2008 Workshop**
  - Presented methodology
  - Distributed 7-page support document
- **January 2009 Workshop**
  - Reviewed methodology
  - Presented cost assumptions
  - Presented preliminary results
- **March 2009 Staff Report**
  - Economic analysis in Chapter VIII
  - Goal to be transparent on entire analysis



# Today's Discussion

- Assumptions
- Calculations
- Conclusions



Questions?





# Contacts

Mike Waugh  
Manager, Program Assistance Section  
916.445.6018  
[mwaugh@arb.ca.gov](mailto:mwaugh@arb.ca.gov)

Ron Oineza  
Alternative Fuel Costs  
916.324.8018  
[roineza@arb.ca.gov](mailto:roineza@arb.ca.gov)

Reza Lorestany  
Economic Analysis  
916.434.5402  
[rloresta@arb.ca.gov](mailto:rloresta@arb.ca.gov)

# Life Cycle Analysis and Land Use Change

March 27, 2009

California Environmental Protection Agency



**Air Resources Board**



# Workshop Comments

- Verbal and written comments submitted at the workshop will not be included in the formal rulemaking record as 45-day public review comments
- Comments will be included in the record if submitted in writing in accordance with the hearing notice or made at the April 23, 2009 Board Hearing



# Submitting Comments

- Comments must be received no later than 12:00 noon PST, April 22, 2009
- Mail to: Clerk of the Board  
Air Resources Board  
1001 I Street  
Sacramento, California 95814
- Electronic submittal:  
<http://www.arb.ca.gov/lispub/comm/bclist.php>
- Facsimile submittal: (916) 322-3928



# Fuel Pathways

Completed	Under Development
<b>CARBOB</b>	<b>Sugarcane Ethanol</b> (using bagasse for electricity and mechanized harvesting of cane)
<b>CaRFG</b>	<b>Cellulosic Ethanol</b> (Farmed Trees, Municipal Waste, Ag. Waste, Forest Waste)
<b>Corn Ethanol (11 sub-pathways)</b>	<b>Biodiesel</b> (Soybeans, Yellow Grease, Fats, Waste Oil, Palm Oil)
<b>Sugarcane Ethanol (Brazilian)</b>	<b>Renewable Diesel</b> (Soybeans, Yellow Grease, Fats, Waste Oil, Palm Oil)
<b>Electricity (2 sub-pathways)</b>	<b>Crude</b> (Oil Sands, Oil Shale)
<b>Hydrogen (4 sub-pathways)</b>	<b>CNG</b> (Digester Gas, Regasified LNG)
<b>ULSD</b>	<b>LNG</b> (Remote NG, Landfill Gas)
<b>CNG (3 sub-pathways)</b>	



## Look Up Table Carbon Intensity (gCO<sub>2</sub>e/MJ)

Fuels	Description	CI
CARBOB	Average CA	95.86
CaRFG	Average CA	95.85
ULSD	Average CA	94.71
CNG	Average North America	68.00
	Landfill Gas	11.26
Electricity	CA Average Mix	124.10
	Marginal	104.70
H <sub>2</sub> (liquid)	Central Reforming (NG)	133.00
H <sub>2</sub> (gaseous)	Central Reforming (NG)	142.20
	Onsite Reforming (NG)	98.30
	Onsite Reforming (compliant with SB1505, NG and Renewable)	76.10
Corn Ethanol	CA Average (80% Midwest, 20% CA)	95.66
Sugarcane Ethanol	Brazilian Average	73.40



## Other Fuels - Carbon Intensity (gCO<sub>2</sub>e/MJ)- Preliminary

Fuels	Description	CA-GREET
Ethanol	Farmed Trees, Fermentation	20.40*
	Forest Waste, Gasification	22.20
Biodiesel	Soybean, FAME	68.93**
Renewable Diesel	Soybean, Hydrogenation process	70.80**
	Tallow, Hydrotreating process	15.0

\* Preliminary LUC value of 18 g CO<sub>2</sub>e/MJ is added to the CA-GREET value

\*\* Preliminary LUC value estimated at 42 g CO<sub>2</sub>e/MJ is added to the CA-GREET value



## Questions/Comments

- Anil Prabhu at 916-327-1501 or via e-mail at [aprabhu@arb.ca.gov](mailto:aprabhu@arb.ca.gov)
- Jim Duffy at 916-327-1513 or via e-mail at [jduffy@arb.ca.gov](mailto:jduffy@arb.ca.gov)
- Chan Pham at 916-323-1069 or via e-mail at [cpham@arb.ca.gov](mailto:cpham@arb.ca.gov)
- Alan Glabe at 916-323-2416 or via e-mail at [aglabbe@arb.ca.gov](mailto:aglabbe@arb.ca.gov)
- John Courtis at 916-323-2661 or via e-mail at [jcourtis@arb.ca.gov](mailto:jcourtis@arb.ca.gov)
- Dean Simeroth at 916-322-6020 or via e-mail at [dsimerot@arb.ca.gov](mailto:dsimerot@arb.ca.gov)



# **Low Carbon Fuel Standard Workshop: Environmental Analysis Summary**

**March 27, 2009**

**California Environmental Protection Agency**



**Air Resources Board**



# Workshop Comments

- Verbal and written comments submitted at the workshop will not be included in the formal rulemaking record as 45-day public review comments
- Comments will be included in the record if submitted in writing in accordance with the hearing notice or made at the April 23, 2009 Board hearing



# Submitting Comments

- Comments must be received no later than 12:00 noon PST, April 22, 2009
- Mail to: Clerk of the Board  
Air Resources Board  
1001 I Street  
Sacramento, California 95814
- Electronic submittal:  
<http://www.arb.ca.gov/lispub/comm/bclist.php>
- Facsimile submittal: (916) 322-3928



# Environmental Impacts

- Greenhouse Emissions Reductions by 2020
  - 16 MMT CO<sub>2</sub>e (fuel combustion)
  - 23 MMT CO<sub>2</sub>e (full fuel lifecycle)
- No Adverse Air Quality Impacts Due to Criteria Pollutants
- Currently Evaluating Toxic Air Pollutant Emissions



# Emissions from Biorefineries

- Emissions from facilities are expected to be mitigated due to local permitting and CEQA requirements (18 cellulosic ethanol, 6 biodiesel)
- Staff is committed to the development of a “Best Practices” guidance document specific for the siting of these new facilities
- Staff is working internally on the method for evaluating impacts on already adversely impacted communities



# Local Health Risk Assessment

- Cancer Risk 0.4 Chances per Million On-site Emissions
- Cancer Risk >5 Chances per Million Combined On-site and Off-site Emissions



## Regional Health Impacts

- 24 Premature Deaths
- 8 Hospital Emissions
- 370 Cases of Asthma, Acute Bronchitis, and Other Lower Respiratory Symptoms



# Contacts

Michelle Werner  
Co-Lead Environmental WG  
916.324.0368  
[mwerner@arb.ca.gov](mailto:mwerner@arb.ca.gov)

Renee Littaua  
Manager, Fuels Section  
916.322.6019  
[rlittaua@arb.ca.gov](mailto:rlittaua@arb.ca.gov)

Carolyn Lozo  
Co-Lead Environmental WG  
916.445.1104  
[clozo@arb.ca.gov](mailto:clozo@arb.ca.gov)

Dean Simeroth  
Chief, Criteria Pollutants Branch  
916.6020  
[dsimeroth@arb.ca.gov](mailto:dsimeroth@arb.ca.gov)